# MEMORANDUM

**To:** Chip Humphrey and Kristine Koch, U.S. Environmental Protection Agency, Region 10

**From:** Lower Willamette Group

**Date:** January 15, 2014

**Re:** Proposed Process for Incorporation of EPA's Dredge Production and Dredge Residual Recommendations for the Portland Harbor Feasibility Study

In a November 20, 2013 email, the U.S. Environmental Protection Agency (EPA) requested that the Lower Willamette Group (LWG) "propose a process that incorporates the dredge production and residual recommendations in the Corps memos that EPA sent to LWG on September 10, 2013." This memorandum proposes such a process for revision of the Portland Harbor Feasibility Study (FS). The memoranda in question were dated May 24, 2013, and May 27, 2013, for the dredge releases/residuals and dredging production rate, respectively. The memoranda were prepared by Paul Schroeder and Karl Gustavson of the U.S. Army Engineer Research and Development Center (ERDC). The LWG-proposed, revised FS process for each memorandum is addressed in the following sections.

## DREDGING PRODUCTION RATES

As reviewed in the May 27, 2013 ERDC dredging production rate memorandum, the draft FS assumes a production rate of 700 cubic yards (cy) per day per dredge plant, which is 2,100 cy per day total, given that simultaneous operation of three dredge plants is assumed in the draft FS. The ERDC memorandum recommends, instead, a higher production rate of 1,867 cy per day per dredge plant, which is 5,601 cy per day, given the same assumption of three dredge plants operating simultaneously. The ERDC memorandum also suggests that further refinements to this rate could be conducted. The LWG has significant concerns about the optimistic nature of the ERDC production rate, including the following:

- The ERDC production rate is significantly higher than those implemented in similar projects in the Pacific Northwest, including T4 Early Action, Gasco Early Action, and Alcoa Vancouver (each in the 500 to 900 cy per day range); Zidell (less than 400 cy per day); Port of Olympia 2009 Interim Action (400 cy per day); East Waterway Duwamish Phase 1 Removal Action (up to 1800 cy per day); Boeing Plant 2 Duwamish, Season 1 (700 to 1000 cy per day); and the Head of Hylebos Waterway (722 to 1150 cy per day). (Citations are in the draft FS or can be supplied upon request).
- The ERDC memorandum cites non-Northwest projects where the highest production rates involve disposal directly into Confined Disposal Facilities, which may only apply to some Portland Harbor alternatives and, at best, a minority of the Portland Harbor sediments.
- The ERDC memorandum cites the Hudson Phase 2 project with a rate of 900 cy per dredge per day (or 2,700 cy per day for three dredge plants), which is only slightly higher than the total production rate used in the draft FS (2,100 cy per day).

- The ERDC memorandum discusses consideration of, but largely ignores, specific local issues, such as available infrastructure as well as water transport, offloading, upland transportation, and disposal bottlenecks, which have been demonstrated constraints on other Pacific Northwest remedial dredging projects.
- The ERDC memorandum discusses the impacts of release/residual best management practices and performance standards on production rates but does not propose specific methods and standards that will allow the assumed higher production rates.
- The ERDC memorandum does not address in any detail the contracting, EPA oversight, and other implementation logistics for this complex site, which has a range of SMA-specific conditions and many responsible parties and contractors as discussed the draft FS. The Portland Harbor situation differs significantly from the situations that the ERDC cited at Hudson River, Buffalo River, and Indiana Harbor sites, all of which involve one responsible party and one contractor.

## Range Evaluation Proposal

Despite these concerns, it is recognized that both the LWG and ERDC production rate estimates are attempts to predict a future condition that is unknown, including issues of the exact dredging methods, cut depths, and equipment to be used; the residuals and water quality controls and performance standards to be imposed; dewatering treatment requirements; the number of dredge plants that can be reasonably mobilized to the site for any given season; the exact offloading and transportation infrastructure to be used; the disposal destinations; contracting and performing parties logistics; and the period of day during which dredging will be allowed due to noise, light, traffic, and other community concerns. Given these uncertainties, the LWG proposes that the revised FS evaluate a range of potential dredge production rates and the impact of those ranges on remedial decisions.

If EPA is agreeable to a range evaluation approach for production rates, the LWG would want to discuss further with EPA the appropriate production rate ranges for such an evaluation. As noted in the draft FS, we believe the draft FS production rates are not the slowest possible production rates for real world environmental dredging in Portland Harbor. And as noted above, it also appears that the ERDC memorandum proposed rates are very optimistic for real world environmental dredging here. Although the LWG is amenable to discussing higher production rates than those in the draft FS as part of a revised FS range evaluation, the LWG believes the high range production rates should be considerably lower than the ERDC estimates for reasons stated above.

Regardless of the range of production rates used in a revised FS evaluation, the methods for such an evaluation would be the same for a variety of potential production rate ranges. Therefore, the methods for incorporating this type of range evaluation into the revised FS are discussed in the following subsection.

## Range Evaluation Methods

Production rates are used in the FS to determine the implementation speed for removal, transport, and disposal required under each alternative. The production rate is an important, but not the

sole, factor in determining the duration of each alternative. Duration can, in turn, impact the sequence of Sediment Management Areas (SMAs) addressed and directly impacts some of the unit cost calculations for each alternative (e.g., dredging unit cost). Duration and sequence can then impact the evaluation of each alternative's effectiveness and feasibility. Some components of the effectiveness evaluation, particularly the fate and transport modeling, specifically rely on the duration and sequence to estimate the impacts of each alternative. Therefore, if the production rates are varied, all of these other FS evaluation components would need to be revised as well.

For reasons discussed above, the LWG continues to believe that the draft FS production rates are reasonable estimates of real world Portland Harbor-specific conditions that already factor in a considerable amount of optimism (i.e., favoring higher production rates). Consequently, it appears appropriate to continue to use these production rates as the "base case" assumption that is used to develop the related FS evaluation components discussed above. In addition, for FS report schedule, cost, and logistical reasons, both EPA and the LWG have discussed the value in using the existing evaluations in the draft FS to continue to support the revised FS, where possible. Consequently, the LWG proposes that the range of dredge production rates only be used to calculate new durations for each alternative. The sequencing, costs, effectiveness (e.g., QEA Fate modeling), and feasibility calculations for each alternative in the revised FS would continue to use the "base case" from the draft FS production rates, sequences, and durations.

As determined through further EPA/LWG discussions, higher production rate-based durations would be presented and used in the alternatives evaluation sections of the revised FS (i.e., the detailed and comparative evaluations represented by the current draft FS Sections 8 and 9). Alternative evaluations that rely on or discuss durations of the alternatives would present the full range of durations as calculated in the range evaluation. This would include any detailed or comparative alternative evaluation tables or graphs that use duration as a metric. For tables, ranges of values would be presented. For graphs, any duration estimates would include error bars or similar indicators of shorter durations that could be attained using the higher production rates.

Finally, as discussed in Section 10 of the draft FS (see Section 10.3.5, 10.3.6, and Appendix U Table 7.1-1 for details), duration is a related metric to short-term effectiveness and implementability. (This should not be inferred to mean that duration is synonymous with or a replacement for the full evaluation of short-term effectiveness and implementability conducted in Sections 8 and 9.) As a result, duration is used to calculate the short-term effectiveness and implementability component scores within the overall summary scoring of alternatives in Section 10. To the extent that EPA desires to use such a scoring system for summarizing the evaluation of alternatives in the revised FS, the effect of the duration ranges proposed in this memorandum could be incorporated into the overall summary score ranges.

## DREDGE RESIDUALS

The May 24, 2013 ERDC dredge residuals memorandum recommends a different method for the calculation of residuals than that used in the fate and transport modeling evaluations in the draft FS. The details of the ERDC-proposed method are provided in the recommendations

section of that memorandum and do not need to be repeated here. Again, the LWG has some specific concerns about the information supporting the ERDC-recommended residual calculation method, including the following:

- All but the Port of Olympia and possibly the West Branch Calumet projects from the post-dredge "cover" mixing citations provided by ERDC actually refer to capping projects, where installation methods are specifically targeted to minimize mixing, which is usually not the case for post-dredge cover project methods. For post dredge covers the material is usually placed under the assumption that mixing will take place during construction and in the future due to natural forces. Using capping methods for post dredge cover placement would greatly increase the time, implementability issues, and expense of completing dredging in each sediment management area.
- The Boeing Plant 2 project, referred to as demonstrating "improved dredging and residuals management," collected insufficient data to assess residuals or the potential release rates associated with them, as this was not the intent of the post-dredge sampling program. For example, dredging was conducted to native clean sand, where 1-foot-long cores were collected of the post-dredge surface, and the entire 1-foot interval was analyzed as a composite. A composite sample of this length would be expected to dilute any potential for an accurate measure of the residuals layer actually present, particularly at low contaminant of concern concentrations.

The draft FS residuals modeling assumptions are based on empirical data on residuals management strategies at other sites, and thus, the LWG believes residuals modeling assumptions are appropriate for an FS-level evaluation. Nonetheless, the LWG agrees that the fate and transport modeling residual calculation was intended to be an estimate of post-dredging residuals to allow easier parameterization of a detailed and spatially varied set of model conditions, not a design level calculation. For this reason, there is a separate Appendix Ib, which presents a more detailed evaluation of dredge residuals production and concentration impacts that would have been difficult to incorporate fully into the fate and transport model. We agree that there are uncertainties in this estimate that are difficult to quantify given that construction methods are unknown at this time, including exact dredge equipment, dredge cut specifications, and EPA's eventual requirements for residuals cleanup passes and cover placement. Note that the draft FS assumes one cleanup pass followed by post dredge cover placement, and the LWG proposes to retain these assumptions for the revised FS.

The LWG proposes a range evaluation that uses the ERDC-specified residuals calculation methods, while continuing to use the draft FS assumptions of one cleanup pass followed by post dredge cover placement. As with the production rates, we continue to believe that the methods used to parameterize residuals effects in the FS fate and transport model are sufficiently accurate for the draft FS evaluations. In addition, propagating changes to the residuals calculations through the entire FS, including fate and transport model parameterization and model runs, would be time and resource intensive. Instead, we propose that for each alternative a static surface be calculated that represents the entire site after all SMAs are remediated.

Currently, the model calculates the post-dredge surfaces by SMA, and then the model fate and transport processes are allowed to function while other SMAs are being actively remediated in a specified sequence. For the residuals range evaluation for each alternative, the post-dredge surfaces will be calculated for all the SMAs at once, using both the current draft FS methods and the ERDC-recommended methods. These overall surface sediment concentrations can then be compared between the two methods to determine how much difference is created in Surface-area Weighted Average Concentrations (SWACs). The SWACs will be calculated on a model grid spatial scale such that SWACs over a wide range of spatial scales can be understood (e.g., site-wide, river segment, and river mile). Color-coded maps showing the magnitude of SWAC differences in each model grid cell can be developed to highlight areas of greater and lesser variation between the two methods.

This range evaluation information would provide additional details to support a discussion in the revised FS on a representative range of impacts of dredge residuals on remediation effectiveness as currently discussed and modeled in the draft FS. By comparing existing draft FS model run SWACs over time to the potential variation in starting SWACs after construction, specific conclusions can be reached about the potential for varying residuals levels to change the outcome of each alternative. For example, if the static SWACs for the two residual calculation methods vary by 5 parts per billion (ppb) in and around a particular SMA, and the draft FS model runs project a change of 70 ppb in that same area over 30 or 45 years, it is unlikely that the variations in residual calculations would change the conclusion substantially for that area for that alternative.

## CONCLUSION

Both the dredge production and dredge residuals proposals in this memorandum provide a specific method to incorporate detailed information regarding EPA's concerns in the revised FS that will support conclusions about remedial effectiveness (and other Superfund FS criteria) through a quantitative range evaluation. This has the added benefit of not requiring wholesale revision of every existing alternative in the draft FS. If EPA is amenable to these proposals, more detailed methods for the calculations for each range evaluation or example evaluation outputs can be provided by the LWG, as necessary.